M0000.022200 Computational plasticity (전산소성역학)

Lecturer: Myoung-Gyu Lee, Professor of MSE

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Class hour: Mon/Wed, 11:00-12:30

Course objective:

The objectives and topics of the computational plasticity course covers the numerical formulations implemented in the finite element method for structural materials such as polycryalline metals, polymers and composites, which accompany large plasticity with irreversible permanent deformation in response to the external forces. This course provides basic theory of constitutive laws including plasticity and viscoplasticity under small and large deformation theory, numerical stress integration algorithms based on general return mapping for the plasticity/viscoplasticity constitutive equations, and basics of the boundary value problems for the finite element implementation. Moreover, (as optional topic) the crystal plasticity theory and implementation for the simulation of single- and polycrystal level deformation responses are presented in this course.

Text book and ref:

Presentation slides will be used. No text book is required.

Evaluation:

Class attendance 10%; Homework 10%; Mid-term project: 40%; Final term project: 40%

Students who are absent for over 1/3 of the class will receive a grade of 'F' or 'U' for the course. (Exceptions can be made when the cause of absence is deemed unavoidable by the course instructor.) In case of online class, the rule can be changeable.

Weekly class schedule:

Week 1: Introduction

Week 2-3: 1-dimensional geometric nonlinear problem and solution

Week 4-5: Shallow truss

Week 5-7: Truss element and solutions for different strain measures

Week 8-9: Basic continuum mechanics

Week 10:   Mid-term project

Week 11-12: Basic continuum mechanics

Week 13: Review of plasticity

Week 14-15: Basic plasticity Part 1-3

Week 15-16: Algorithmic tangent modulus & summary

Final-term project

Ref:

Final scores of those who repeat this course will be only 90% of their total scores.

This is a theory based course, and online class will be provided. If we need face-to-face class, we will discuss it in advance.

Students who take this course can get appropriate level of support service including the support listed above depending on the students' individual characteristics and needs through consultation with professors and the Support Center for Students with Disabilities. If you have any questions concerning support service for students with disabilities you can contact Professor Myoung-Gyu Lee) or Support Center for Students with Disabilities (02-880-8787).